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Frischauf, Anna Maria

<120> METHODS AND COMPOSITIONS RELATING TO CD39-LIKE POLYPEPTIDES AND NUCLEIC ACIDS

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<140> 09/905,732

<141> 2001-07-13

<150> 09/240,639

<151> 1999-01-29

<160> 32

<170> PatentIn version 3.1

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aaaacgagct acatttttca gcagccgcag cacggtcctt ggcaaacaag g atg aga      237
                                                          Met Arg
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aaa ata tcc aac cac ggg agc ctg cgg gtg gcg aag gtg gca tac ccc      285
Lys Ile Ser Asn His Gly Ser Leu Arg Val Ala Lys Val Ala Tyr Pro
         5                  10                  15

ctg ggg ctg tgt gtg ggc gtg ttc atc tat gtt gcc tac atc aag tgg      333
Leu Gly Leu Cys Val Gly Val Phe Ile Tyr Val Ala Tyr Ile Lys Trp
     20                  25                  30

cac cgg gcc acc gcc acc cag gcc ttc ttc agc atc acc agg gca gcc      381
His Arg Ala Thr Ala Thr Gln Ala Phe Phe Ser Ile Thr Arg Ala Ala
35                  40                  45                  50

ccg ggg gcc cgg tgg ggt cag cag gcc cac agc ccc ctg ggg aca gct      429
Pro Gly Ala Arg Trp Gly Gln Gln Ala His Ser Pro Leu Gly Thr Ala
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gca gac ggg cac gag gtc ttc tac ggg atc atg ttt gat gca gga agc      477
Ala Asp Gly His Glu Val Phe Tyr Gly Ile Met Phe Asp Ala Gly Ser
                 70                  75                  80

act ggc acc cga gta cac gtc ttc cag ttc acc cgg ccc ccc aga gaa      525
Thr Gly Thr Arg Val His Val Phe Gln Phe Thr Arg Pro Pro Arg Glu
             85                  90                  95

act ccc acg tta acc cac gaa acc ttc aaa gca gtg aag cca ggt ctt      573
Thr Pro Thr Leu Thr His Glu Thr Phe Lys Ala Val Lys Pro Gly Leu
100                 105                 110

tct gcc tat gct gat gat gtt gaa aag agc gct cag gga atc cgg gaa      621
Ser Ala Tyr Ala Asp Asp Val Glu Lys Ser Ala Gln Gly Ile Arg Glu
115                 120                 125                 130

cta ctg gat gtt gct aaa cag gac att ccg ttc gac ttc tgg aag gcc      669
Leu Leu Asp Val Ala Lys Gln Asp Ile Pro Phe Asp Phe Trp Lys Ala
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acc cct ctg gtc ctc aag gcc aca gct ggc tta cgc ctg tta cct gga      717
Thr Pro Leu Val Leu Lys Ala Thr Ala Gly Leu Arg Leu Leu Pro Gly
                150                 155                 160

gaa aag gcc cag aag tta ctg cag aag gtg aaa gaa gta ttt aaa gca      765
Glu Lys Ala Gln Lys Leu Leu Gln Lys Val Lys Glu Val Phe Lys Ala
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tcg cct ttc ctt gta ggg gat gac tgt gtt tcc atc atg aac gga aca      813
Ser Pro Phe Leu Val Gly Asp Asp Cys Val Ser Ile Met Asn Gly Thr
         180                 185                 190

gat gaa ggc gtt tcg gcg tgg atc acc atc aac ttc ctg aca ggc agc      861
Asp Glu Gly Val Ser Ala Trp Ile Thr Ile Asn Phe Leu Thr Gly Ser
195                 200                 205                 210

ttg aaa act cca gga ggg agc agc gtg ggc atg ctg gac ttg ggc gga      909
Leu Lys Thr Pro Gly Gly Ser Ser Val Gly Met Leu Asp Leu Gly Gly
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Gly Ser Thr Gln Ile Ala Phe Leu Pro Arg Val Glu Gly Thr Leu Gln
        230                 235                 240

gcc tcc cca ccc ggc tac ctg acg gca ctg cgg atg ttt aac agg acc   1005
Ala Ser Pro Pro Gly Tyr Leu Thr Ala Leu Arg Met Phe Asn Arg Thr
        245                 250                 255

tac aag ctc tat tcc tac agc tac ctc ggg ctc ggg ctg atg tcg gca   1053
Tyr Lys Leu Tyr Ser Tyr Ser Tyr Leu Gly Leu Gly Leu Met Ser Ala
        260                 265                 270

cgc ctg gcg atc ctg ggc ggc gtg gag ggg cag cct gct aag gat gga   1101
Arg Leu Ala Ile Leu Gly Gly Val Glu Gly Gln Pro Ala Lys Asp Gly
275                 280                 285                 290

aag gag ttg gtc agc cct tgc ttg tct ccc agt ttc aaa gga gag tgg   1149
Lys Glu Leu Val Ser Pro Cys Leu Ser Pro Ser Phe Lys Gly Glu Trp
                295                 300                 305

gaa cac gca gaa gtc acg tac agg gtt tca ggg cag aaa gca gcg gca   1197
Glu His Ala Glu Val Thr Tyr Arg Val Ser Gly Gln Lys Ala Ala Ala
        310                 315                 320

agc ctg cac gag ctg tgt gct gcc aga gtg tca gag gtc ctt caa aac   1245
Ser Leu His Glu Leu Cys Ala Ala Arg Val Ser Glu Val Leu Gln Asn
        325                 330                 335

aga gtg cac agg acg gag gaa gtg aag cat gtg gac ttc tat gct ttc   1293
Arg Val His Arg Thr Glu Glu Val Lys His Val Asp Phe Tyr Ala Phe
    340                 345                 350

tcc tac tat tac gac ctt gca gct ggt gtg ggc ctc ata gat gcg gag   1341
Ser Tyr Tyr Tyr Asp Leu Ala Ala Gly Val Gly Leu Ile Asp Ala Glu
355                 360                 365                 370

aag gga ggc agc ctg gtg gtg ggg gac ttc gag atc gca gcc aag tac   1389
Lys Gly Gly Ser Leu Val Val Gly Asp Phe Glu Ile Ala Ala Lys Tyr
                375                 380                 385

gtg tgt cgg acc ctg gag aca cag ccg cag agc agc ccc ttc tca tgc   1437
Val Cys Arg Thr Leu Glu Thr Gln Pro Gln Ser Ser Pro Phe Ser Cys
        390                 395                 400

atg gac ctc acc tac gtc agc ctg cta ctc cag gag ttc ggc ttt ccc   1485
Met Asp Leu Thr Tyr Val Ser Leu Leu Leu Gln Glu Phe Gly Phe Pro
        405                 410                 415

agg agc aaa gtg ctg aag ctc act cgg aaa att gac aat gtt gag acc   1533
Arg Ser Lys Val Leu Lys Leu Thr Arg Lys Ile Asp Asn Val Glu Thr
        420                 425                 430

agc tgg gct ctg ggg gcc att ttt cat tac atc gac tcc ctg aac aga   1581
Ser Trp Ala Leu Gly Ala Ile Phe His Tyr Ile Asp Ser Leu Asn Arg
435                 440                 445                 450

cag aag agt cca gcc tca tagtggccga gccatccctg tccccgtcag          1629
Gln Lys Ser Pro Ala Ser
                455

cagtgtctgt gtgtctgcat aaaccctcct gtcctggacg tgacttcatc ctgaggagcc  1689

acagcacagg ccgtgctggc actttctgca cactggctct gggacttgca gaaggcctgg   1749
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Page 3

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ccctgctcaa tgccacctgt ctgcctgggc tccaagtggg caggaccagg acagaaccac    1869
aggcacacac tgaggggggca gtgtggctcc ctgcctgtcc catccccatg ccccgtccgc    1929
ggggctgtgg ctgctgctgt gcatgtccct gcgatgggag tcttgtctcc cagcctgtca    1989
gtttcctccc cagggcagag ctccccttcc tgcaagagtc tgggaggcgg tgcaggctgt    2049
cctggctgct ctggggaagc cgagggacag ccataacacc cccgggacag taggtctggg    2109
cggcaccact gggaactctg gacttgagtg tgtttgctct tccttgggta tgaatgtgtg    2169
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Tyr Pro Leu Gly Leu Cys Val Gly Val Phe Ile Tyr Val Ala Tyr Ile
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Lys Trp His Arg Ala Thr Ala Thr Gln Ala Phe Phe Ser Ile Thr Arg
        35                  40                  45


Ala Ala Pro Gly Ala Arg Trp Gly Gln Gln Ala His Ser Pro Leu Gly
    50                  55                  60
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Thr Ala Ala Asp Gly His Glu Val Phe Tyr Gly Ile Met Phe Asp Ala
65   70   75   80

Gly Ser Thr Gly Thr Arg Val His Val Phe Gln Phe Thr Arg Pro Pro
            85   90   95

Arg Glu Thr Pro Thr Leu Thr His Glu Thr Phe Lys Ala Val Lys Pro
            100   105   110

Gly Leu Ser Ala Tyr Ala Asp Asp Val Glu Lys Ser Ala Gln Gly Ile
            115   120   125

Arg Glu Leu Leu Asp Val Ala Lys Gln Asp Ile Pro Phe Asp Phe Trp
    130   135   140

Lys Ala Thr Pro Leu Val Leu Lys Ala Thr Ala Gly Leu Arg Leu Leu
145   150   155   160

Pro Gly Glu Lys Ala Gln Lys Leu Leu Gln Lys Val Lys Glu Val Phe
                165   170   175

Lys Ala Ser Pro Phe Leu Val Gly Asp Asp Cys Val Ser Ile Met Asn
            180   185   190

Gly Thr Asp Glu Gly Val Ser Ala Trp Ile Thr Ile Asn Phe Leu Thr
            195   200   205

Gly Ser Leu Lys Thr Pro Gly Gly Ser Ser Val Gly Met Leu Asp Leu
    210   215   220

Gly Gly Gly Ser Thr Gln Ile Ala Phe Leu Pro Arg Val Glu Gly Thr
225   230   235   240

Leu Gln Ala Ser Pro Pro Gly Tyr Leu Thr Ala Leu Arg Met Phe Asn
            245   250   255

Arg Thr Tyr Lys Leu Tyr Ser Tyr Ser Tyr Leu Gly Leu Gly Leu Met
            260   265   270

Ser Ala Arg Leu Ala Ile Leu Gly Gly Val Glu Gly Gln Pro Ala Lys
    275   280   285

Asp Gly Lys Glu Leu Val Ser Pro Cys Leu Ser Pro Ser Phe Lys Gly
    290   295   300

Glu Trp Glu His Ala Glu Val Thr Tyr Arg Val Ser Gly Gln Lys Ala
305   310   315   320

Page 5

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Ala Ala Ser Leu His Glu Leu Cys Ala Ala Arg Val Ser Glu Val Leu
                325             330                 335

Gln Asn Arg Val His Arg Thr Glu Glu Val Lys His Val Asp Phe Tyr
            340             345                 350

Ala Phe Ser Tyr Tyr Tyr Asp Leu Ala Ala Gly Val Gly Leu Ile Asp
            355                 360             365

Ala Glu Lys Gly Gly Ser Leu Val Val Gly Asp Phe Glu Ile Ala Ala
        370             375                 380

Lys Tyr Val Cys Arg Thr Leu Glu Thr Gln Pro Gln Ser Ser Pro Phe
385                 390                 395                 400

Ser Cys Met Asp Leu Thr Tyr Val Ser Leu Leu Leu Gln Glu Phe Gly
                405             410                 415

Phe Pro Arg Ser Lys Val Leu Lys Leu Thr Arg Lys Ile Asp Asn Val
            420             425                 430

Glu Thr Ser Trp Ala Leu Gly Ala Ile Phe His Tyr Ile Asp Ser Leu
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Asn Arg Gln Lys Ser Pro Ala Ser
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                         Met Phe Thr Val Leu Thr Arg Gln Pro Cys
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                1   5   10

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gag caa gca ggc ctc aag gcc ctc tac cga act cca acc atc att gcc    160
Glu Gln Ala Gly Leu Lys Ala Leu Tyr Arg Thr Pro Thr Ile Ile Ala
            15                  20                  25

ttg gtg gtc ttg ctt gtg agt att gtg gta ctt gtg agt atc act gtc    208
Leu Val Val Leu Leu Val Ser Ile Val Val Leu Val Ser Ile Thr Val
            30                  35                  40

atc cag atc cac aag caa gag gtc ctc cct cca gga ctg aag tat ggt    256
Ile Gln Ile His Lys Gln Glu Val Leu Pro Pro Gly Leu Lys Tyr Gly
            45                  50                  55

att gtg ctg gat gcc ggg tct tca aga acc aca gtc tac gtg tat caa    304
Ile Val Leu Asp Ala Gly Ser Ser Arg Thr Thr Val Tyr Val Tyr Gln
            60                  65                  70

tgg cca gca gaa aaa gag aat aat acc gga gtg gtc agt caa acc ttc    352
Trp Pro Ala Glu Lys Glu Asn Asn Thr Gly Val Val Ser Gln Thr Phe
75                  80                  85                  90

aaa tgt agt gtg aaa ggc tct gga atc tcc agc tat gga aat aac ccc    400
Lys Cys Ser Val Lys Gly Ser Gly Ile Ser Ser Tyr Gly Asn Asn Pro
                95                  100                 105

caa gat gtc ccc aga gcc ttt gag gag tgt atg caa aaa gtc aag ggg    448
Gln Asp Val Pro Arg Ala Phe Glu Glu Cys Met Gln Lys Val Lys Gly
                110                 115                 120

cag gtt cca tcc cac ctc cac gga tcc acc ccc att cac ctg gga gcc    496
Gln Val Pro Ser His Leu His Gly Ser Thr Pro Ile His Leu Gly Ala
                125                 130                 135

acg gct ggg atg cgc ttg ctg agg ttg caa aat gaa aca gca gct aat    544
Thr Ala Gly Met Arg Leu Leu Arg Leu Gln Asn Glu Thr Ala Ala Asn
            140                 145                 150

gaa gtc ctt gaa agc atc caa agc tac ttc aag tcc cag ccc ttt gac    592
Glu Val Leu Glu Ser Ile Gln Ser Tyr Phe Lys Ser Gln Pro Phe Asp
155                 160                 165                 170

ttt agg ggt gct caa atc att tct ggg caa gaa gaa ggg gta tat gga    640
Phe Arg Gly Ala Gln Ile Ile Ser Gly Gln Glu Glu Gly Val Tyr Gly
                175                 180                 185

tgg att aca gcc aac tat tta atg gga aat ttc ctg gag aag aac ctg    688
Trp Ile Thr Ala Asn Tyr Leu Met Gly Asn Phe Leu Glu Lys Asn Leu
            190                 195                 200

tgg cac atg tgg gtg cac ccg cat gga gtg gaa acc acg ggt gcc ctg    736
Trp His Met Trp Val His Pro His Gly Val Glu Thr Thr Gly Ala Leu
            205                 210                 215

gac tta ggt ggt gcc tcc acc caa ata tcc ttc gtg gca gga gag aag    784
Asp Leu Gly Gly Ala Ser Thr Gln Ile Ser Phe Val Ala Gly Glu Lys
            220                 225                 230

atg gat ctg aac acc agc gac atc atg cag gtg tcc ctg tat ggc tac    832
Met Asp Leu Asn Thr Ser Asp Ile Met Gln Val Ser Leu Tyr Gly Tyr
235                 240                 245                 250

gta tac acg ctc tac aca cac agc ttc cag tgc tat ggc cgg aat gag    880
```

```
Val Tyr Thr Leu Tyr Thr His Ser Phe Gln Cys Tyr Gly Arg Asn Glu
                255             260             265
```

```
gct gag aag aag ttt ctg gca atg ctc ctg cag aat tct cct acc aaa    928
Ala Glu Lys Lys Phe Leu Ala Met Leu Leu Gln Asn Ser Pro Thr Lys
            270             275             280
```

```
aac cat ctc acc aat ccc tgt tac cct cgg gat tat agc atc agc ttc    976
Asn His Leu Thr Asn Pro Cys Tyr Pro Arg Asp Tyr Ser Ile Ser Phe
            285             290             295
```

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acc atg ggc cat gta ttt gat agc ctg tgc act gtg gac cag agg cca    1024
Thr Met Gly His Val Phe Asp Ser Leu Cys Thr Val Asp Gln Arg Pro
    300             305             310
```

```
gaa agt tat aac ccc aat gat gtc atc act ttt gaa gga act ggg gac    1072
Glu Ser Tyr Asn Pro Asn Asp Val Ile Thr Phe Glu Gly Thr Gly Asp
315             320             325             330
```

```
cca tct ctg tgt aag gag aag gtg gct tcc ata ttt gac ttc aaa gct    1120
Pro Ser Leu Cys Lys Glu Lys Val Ala Ser Ile Phe Asp Phe Lys Ala
            335             340             345
```

```
tgc cat gat caa gaa acc tgt tct ttt gat ggg gtt tat cag cca aag    1168
Cys His Asp Gln Glu Thr Cys Ser Phe Asp Gly Val Tyr Gln Pro Lys
            350             355             360
```

```
att aaa ggg cca ttt gtg gct ttt gca gga ttc tac tac aca gcc agt    1216
Ile Lys Gly Pro Phe Val Ala Phe Ala Gly Phe Tyr Tyr Thr Ala Ser
            365             370             375
```

```
gct tta aat ctt tca ggt agc ttt tcc ctg gac acc ttc aac tcc agc    1264
Ala Leu Asn Leu Ser Gly Ser Phe Ser Leu Asp Thr Phe Asn Ser Ser
    380             385             390
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```
acc tgg aat ttc tgc tca cag aat tgg agt cag ctc cca ctg ctg ctc    1312
Thr Trp Asn Phe Cys Ser Gln Asn Trp Ser Gln Leu Pro Leu Leu Leu
395             400             405             410
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ccc aaa ttt gat gag gta tat gcc cgc tct tac tgc ttc tca gcc aac    1360
Pro Lys Phe Asp Glu Val Tyr Ala Arg Ser Tyr Cys Phe Ser Ala Asn
                415             420             425
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tac atc tac cac ttg ttt gtg aac ggt tac aaa ttc aca gag gag act    1408
Tyr Ile Tyr His Leu Phe Val Asn Gly Tyr Lys Phe Thr Glu Glu Thr
            430             435             440
```

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tgg ccc caa ata cac ttt gaa aaa gaa gtg ggg aat agc agc ata gcc    1456
Trp Pro Gln Ile His Phe Glu Lys Glu Val Gly Asn Ser Ser Ile Ala
            445             450             455
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tgg tct ctt ggc tac atg ctc agc ctg acc aac cag atc cca gct gaa    1504
Trp Ser Leu Gly Tyr Met Leu Ser Leu Thr Asn Gln Ile Pro Ala Glu
    460             465             470
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agc cct ctg atc cgt ctg ccc ata gaa cca cct gtc ttt gtg ggc acc    1552
Ser Pro Leu Ile Arg Leu Pro Ile Glu Pro Pro Val Phe Val Gly Thr
475             480             485             490
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ctc gct ttc ttc aca gtg gca gcc ttg ctg tgt ctg gca ttt ctt gca    1600
Leu Ala Phe Phe Thr Val Ala Ala Leu Leu Cys Leu Ala Phe Leu Ala
            495             500             505
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tac ctg tgt tca gca acc aga aga aag agg cac tcc gag cat gcc ttt      1648
Tyr Leu Cys Ser Ala Thr Arg Arg Lys Arg His Ser Glu His Ala Phe
            510                 515                 520

gac cat gca gtg gat tct gac tgagccttca aagcagctcc tggagtccaa         1699
Asp His Ala Val Asp Ser Asp
            525
```

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tggctgctta gagtcagcct gggtggcacc aggcaatgca ggtgaagtgg ctgccttcag      1759

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ccacagcacc tcttgaggca tcccttggct attctgtgca tattgttctt cagagacctc      1879

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        20   25   30

Ser Ile Val Val Leu Val Ser Ile Thr Val Ile Gln Ile His Lys Gln
        35   40   45

Glu Val Leu Pro Pro Gly Leu Lys Tyr Gly Ile Val Leu Asp Ala Gly
        50   55   60

Ser Ser Arg Thr Thr Val Tyr Val Tyr Gln Trp Pro Ala Glu Lys Glu
65   70   75   80

Asn Asn Thr Gly Val Val Ser Gln Thr Phe Lys Cys Ser Val Lys Gly
            85   90   95

Ser Gly Ile Ser Ser Tyr Gly Asn Asn Pro Gln Asp Val Pro Arg Ala
           100   105   110

Phe Glu Glu Cys Met Gln Lys Val Lys Gly Gln Val Pro Ser His Leu
           115   120   125

His Gly Ser Thr Pro Ile His Leu Gly Ala Thr Ala Gly Met Arg Leu
           130   135   140

Leu Arg Leu Gln Asn Glu Thr Ala Ala Asn Glu Val Leu Glu Ser Ile
145   150   155   160

Gln Ser Tyr Phe Lys Ser Gln Pro Phe Asp Phe Arg Gly Ala Gln Ile
           165   170   175

Ile Ser Gly Gln Glu Glu Gly Val Tyr Gly Trp Ile Thr Ala Asn Tyr
           180   185   190

Leu Met Gly Asn Phe Leu Glu Lys Asn Leu Trp His Met Trp Val His
           195   200   205

Pro His Gly Val Glu Thr Thr Gly Ala Leu Asp Leu Gly Gly Ala Ser
210   215   220

Thr Gln Ile Ser Phe Val Ala Gly Glu Lys Met Asp Leu Asn Thr Ser
225   230   235   240

Asp Ile Met Gln Val Ser Leu Tyr Gly Tyr Val Tyr Thr Leu Tyr Thr
           245   250   255

His Ser Phe Gln Cys Tyr Gly Arg Asn Glu Ala Glu Lys Lys Phe Leu
           260   265   270

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Ala Met Leu Leu Gln Asn Ser Pro Thr Lys Asn His Leu Thr Asn Pro
        275               280               285

Cys Tyr Pro Arg Asp Tyr Ser Ile Ser Phe Thr Met Gly His Val Phe
        290               295               300

Asp Ser Leu Cys Thr Val Asp Gln Arg Pro Glu Ser Tyr Asn Pro Asn
305               310               315               320

Asp Val Ile Thr Phe Glu Gly Thr Gly Asp Pro Ser Leu Cys Lys Glu
                325               330               335

Lys Val Ala Ser Ile Phe Asp Phe Lys Ala Cys His Asp Gln Glu Thr
                340               345               350

Cys Ser Phe Asp Gly Val Tyr Gln Pro Lys Ile Lys Gly Pro Phe Val
        355               360               365

Ala Phe Ala Gly Phe Tyr Tyr Thr Ala Ser Ala Leu Asn Leu Ser Gly
        370               375               380

Ser Phe Ser Leu Asp Thr Phe Asn Ser Ser Thr Trp Asn Phe Cys Ser
385               390               395               400

Gln Asn Trp Ser Gln Leu Pro Leu Leu Leu Pro Lys Phe Asp Glu Val
                405               410               415

Tyr Ala Arg Ser Tyr Cys Phe Ser Ala Asn Tyr Ile Tyr His Leu Phe
                420               425               430

Val Asn Gly Tyr Lys Phe Thr Glu Glu Thr Trp Pro Gln Ile His Phe
                435               440               445

Glu Lys Glu Val Gly Asn Ser Ser Ile Ala Trp Ser Leu Gly Tyr Met
        450               455               460

Leu Ser Leu Thr Asn Gln Ile Pro Ala Glu Ser Pro Leu Ile Arg Leu
465               470               475               480

Pro Ile Glu Pro Pro Val Phe Val Gly Thr Leu Ala Phe Phe Thr Val
                485               490               495

Ala Ala Leu Leu Cys Leu Ala Phe Leu Ala Tyr Leu Cys Ser Ala Thr
                500               505               510

Arg Arg Lys Arg His Ser Glu His Ala Phe Asp His Ala Val Asp Ser
        515               520               525
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tcatacagac aagatcatta tggtgctgtt aggtaggact tgtatccaga tgtaaggttg         120

aaaaagtgat ataataaagg aaccaaggag aaaattcaga aggaaagaaa aaattgcctc         180

tgcaggtgtg cgagcaggat tgcttctgca acaaaagcct ccacccagcc acatcttggg         240
```

```
aaaaga atg gcc act tct tgg ggc aca gtc ttt ttc atg ctg gtg gta              288
        Met Ala Thr Ser Trp Gly Thr Val Phe Phe Met Leu Val Val
        1               5                  10
```

```
tcc tgt gtt tgc agc gct gtc tcc cac agg aac cag cag act tgg ttt            336
Ser Cys Val Cys Ser Ala Val Ser His Arg Asn Gln Gln Thr Trp Phe
15              20              25                  30
```

```
gag ggt atc ttc ctg tct tcc atg tgc ccc atc aat gtc agc gcc agc            384
Glu Gly Ile Phe Leu Ser Ser Met Cys Pro Ile Asn Val Ser Ala Ser
                35                  40                  45
```

```
acc ttg tat gga att atg ttt gat gca ggg agc act gga act cga att            432
Thr Leu Tyr Gly Ile Met Phe Asp Ala Gly Ser Thr Gly Thr Arg Ile
                50                  55                  60
```

```
cat gtt tac acc ttt gtg cag aaa atg cca gga cag ctt cca att cta            480
His Val Tyr Thr Phe Val Gln Lys Met Pro Gly Gln Leu Pro Ile Leu
            65                  70                  75
```

```
gaa ggg gaa gtt ttt gat tct gtg aag cca gga ctt tct gct ttt gta            528
Glu Gly Glu Val Phe Asp Ser Val Lys Pro Gly Leu Ser Ala Phe Val
            80                  85                  90
```

```
gat caa cct aag cag ggt gct gag acc gtt caa ggg ctc tta gag gtg            576
Asp Gln Pro Lys Gln Gly Ala Glu Thr Val Gln Gly Leu Leu Glu Val
95                  100                 105                 110
```

```
gcc aaa gac tca atc ccc cga agt cac tgg aaa aag acc cca gtg gtc     624
Ala Lys Asp Ser Ile Pro Arg Ser His Trp Lys Lys Thr Pro Val Val
        115             120                 125

cta aag gca aca gca gga cta cgc tta ctg cca gaa cac aaa gcc aag     672
Leu Lys Ala Thr Ala Gly Leu Arg Leu Leu Pro Glu His Lys Ala Lys
        130             135                 140

gct ctg ctc ttt gag gta aag gag atc ttc agg aag tca cct ttc ctg     720
Ala Leu Leu Phe Glu Val Lys Glu Ile Phe Arg Lys Ser Pro Phe Leu
        145             150                 155

gta cca aag ggc agt gtt agc atc atg gat gga tcc gac gaa ggc ata     768
Val Pro Lys Gly Ser Val Ser Ile Met Asp Gly Ser Asp Glu Gly Ile
        160             165                 170

tta gct tgg gtt act gtg aat ttt ctg aca ggt cag ctg cat ggc cac     816
Leu Ala Trp Val Thr Val Asn Phe Leu Thr Gly Gln Leu His Gly His
175             180                 185                 190

aga cag gag act gtg ggg acc ttg gac cta ggg gga gcc tcc acc caa     864
Arg Gln Glu Thr Val Gly Thr Leu Asp Leu Gly Gly Ala Ser Thr Gln
            195                 200                 205

atc acg ttc ctg ccc cag ttt gag aaa act ctg gaa caa act cct agg     912
Ile Thr Phe Leu Pro Gln Phe Glu Lys Thr Leu Glu Gln Thr Pro Arg
            210                 215                 220

ggc tac ctc act tcc ttt gag atg ttt aac agc act tat aag ctc tat     960
Gly Tyr Leu Thr Ser Phe Glu Met Phe Asn Ser Thr Tyr Lys Leu Tyr
            225                 230                 235

aca cat agt tac ttg gga ttt gga ttg aaa gct gca aga cta gca acc     1008
Thr His Ser Tyr Leu Gly Phe Gly Leu Lys Ala Ala Arg Leu Ala Thr
    240                 245                 250

ctg gga gcc ctg gag aca gaa ggg act gat ggg cac act ttc cgg agt     1056
Leu Gly Ala Leu Glu Thr Glu Gly Thr Asp Gly His Thr Phe Arg Ser
255                 260                 265                 270

gcc tgt tta ccg aga tgg ttg gaa gca gag tgg atc ttt ggg ggt gtg     1104
Ala Cys Leu Pro Arg Trp Leu Glu Ala Glu Trp Ile Phe Gly Gly Val
                275                 280                 285

aaa tac cag tat ggt ggc aac caa gaa ggg gag gtg ggc ttt gag ccc     1152
Lys Tyr Gln Tyr Gly Gly Asn Gln Glu Gly Glu Val Gly Phe Glu Pro
                290                 295                 300

tgc tat gcc gaa gtg ctg agg gtg gta cga gga aaa ctt cac cag cca     1200
Cys Tyr Ala Glu Val Leu Arg Val Val Arg Gly Lys Leu His Gln Pro
        305                 310                 315

gag gag gtc cag aga ggt tcc ttc tat gct ttc tct tac tat tat gac     1248
Glu Glu Val Gln Arg Gly Ser Phe Tyr Ala Phe Ser Tyr Tyr Tyr Asp
        320                 325                 330

cga gct gtt gac aca gac atg att gat tat gaa aag ggg ggt att tta     1296
Arg Ala Val Asp Thr Asp Met Ile Asp Tyr Glu Lys Gly Gly Ile Leu
335                 340                 345                 350

aaa gtt gaa gat ttt gaa aga aaa gcc agg gaa gtg tgt gat aac ttg     1344
Lys Val Glu Asp Phe Glu Arg Lys Ala Arg Glu Val Cys Asp Asn Leu
                355                 360                 365
```

Page 13

```
gaa aac ttc acc tca ggc agt cct ttc ctg tgc atg gat ctc agc tac    1392
Glu Asn Phe Thr Ser Gly Ser Pro Phe Leu Cys Met Asp Leu Ser Tyr
            370             375                 380

atc aca gcc ctg tta aag gat ggc ttt ggc ttt gca gac agc aca gtc    1440
Ile Thr Ala Leu Leu Lys Asp Gly Phe Gly Phe Ala Asp Ser Thr Val
            385             390                 395

tta cag ctc aca aag aaa gtg aac aac ata gag acg ggc tgg gcc ttg    1488
Leu Gln Leu Thr Lys Lys Val Asn Asn Ile Glu Thr Gly Trp Ala Leu
            400             405                 410

ggg gcc acc ttt cac ctg ttg cag tct ctg ggc atc tcc cat           1530
Gly Ala Thr Phe His Leu Leu Gln Ser Leu Gly Ile Ser His
415             420                 425

tgaggccacg tacttccttg gagacctgca tttgccaaca cctttttaag gggaggagag    1590

agcacttagt ttctgaacta gtctgggaca tcctggactt gagcctagag atttaggttt    1650

aattaatttt acacatctaa tgtgaactgc tgcctaacca ctcaagagta cacagctggc    1710

accagagcat cacagagagc cctgtgagcc aaaaagtata gttttggaac ttaaccttgg    1770

agtgagagcc cagggacagg tccctggaaa ccaaagaaaa atcgcatttc aaccctttga    1830

gtgcctcatt ccactgaata tttaaatttt cctcttaaat ggtaaactga cttattgcaa    1890

tcccaagacc catcaatatc agtatttttt tcctccctat acagtgccct gcccaccctt    1950

atctgcaccc acctcccctg aaaagagag aaaaaaaaaa aaaaaaaa                 1998
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<210> 6

<211> 428

<212> PRT

<213> Homo sapiens

<400> 6

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Met Ala Thr Ser Trp Gly Thr Val Phe Phe Met Leu Val Val Ser Cys
1               5                   10                  15

Val Cys Ser Ala Val Ser His Arg Asn Gln Gln Thr Trp Phe Glu Gly
                20                  25                  30

Ile Phe Leu Ser Ser Met Cys Pro Ile Asn Val Ser Ala Ser Thr Leu
                35                  40                  45

Tyr Gly Ile Met Phe Asp Ala Gly Ser Thr Gly Thr Arg Ile His Val
        50                  55                  60

Tyr Thr Phe Val Gln Lys Met Pro Gly Gln Leu Pro Ile Leu Glu Gly
```

Page 14

65   70   75   80

Glu Val Phe Asp Ser Val Lys Pro Gly Leu Ser Ala Phe Val Asp Gln
85   90   95

Pro Lys Gln Gly Ala Glu Thr Val Gln Gly Leu Leu Glu Val Ala Lys
100   105   110

Asp Ser Ile Pro Arg Ser His Trp Lys Lys Thr Pro Val Val Leu Lys
115   120   125

Ala Thr Ala Gly Leu Arg Leu Leu Pro Glu His Lys Ala Lys Ala Leu
130   135   140

Leu Phe Glu Val Lys Glu Ile Phe Arg Lys Ser Pro Phe Leu Val Pro
145   150   155   160

Lys Gly Ser Val Ser Ile Met Asp Gly Ser Asp Glu Gly Ile Leu Ala
165   170   175

Trp Val Thr Val Asn Phe Leu Thr Gly Gln Leu His Gly His Arg Gln
180   185   190

Glu Thr Val Gly Thr Leu Asp Leu Gly Gly Ala Ser Thr Gln Ile Thr
195   200   205

Phe Leu Pro Gln Phe Glu Lys Thr Leu Glu Gln Thr Pro Arg Gly Tyr
210   215   220

Leu Thr Ser Phe Glu Met Phe Asn Ser Thr Tyr Lys Leu Tyr Thr His
225   230   235   240

Ser Tyr Leu Gly Phe Gly Leu Lys Ala Ala Arg Leu Ala Thr Leu Gly
245   250   255

Ala Leu Glu Thr Glu Gly Thr Asp Gly His Thr Phe Arg Ser Ala Cys
260   265   270

Leu Pro Arg Trp Leu Glu Ala Glu Trp Ile Phe Gly Gly Val Lys Tyr
275   280   285

Gln Tyr Gly Gly Asn Gln Glu Gly Glu Val Gly Phe Glu Pro Cys Tyr
290   295   300

Ala Glu Val Leu Arg Val Val Arg Gly Lys Leu His Gln Pro Glu Glu
305   310   315   320

```
Val Gln Arg Gly Ser Phe Tyr Ala Phe Ser Tyr Tyr Tyr Asp Arg Ala
              325                 330                 335

Val Asp Thr Asp Met Ile Asp Tyr Glu Lys Gly Gly Ile Leu Lys Val
              340                 345                 350

Glu Asp Phe Glu Arg Lys Ala Arg Glu Val Cys Asp Asn Leu Glu Asn
              355                 360                 365

Phe Thr Ser Gly Ser Pro Phe Leu Cys Met Asp Leu Ser Tyr Ile Thr
              370                 375                 380

Ala Leu Leu Lys Asp Gly Phe Gly Phe Ala Asp Ser Thr Val Leu Gln
385                 390                 395                 400

Leu Thr Lys Lys Val Asn Asn Ile Glu Thr Gly Trp Ala Leu Gly Ala
              405                 410                 415

Thr Phe His Leu Leu Gln Ser Leu Gly Ile Ser His
              420                 425
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<210> 7

<211> 2119

<212> DNA

<213> Mus musculus

<220>

<221> CDS

<222> (205)..(1599)

<223>

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atgtgctttt taaattggcc tgcgtgaccc gcccacttgg tgtaaaagaa gaaccggcca     120

aagggagggc ctgaaggacc tccacaggag tgtgagcagc actgcttcag caacaaagcc     180

tcaggtccac atcttgggaa gaat atg gcc act tcc tgg ggg gct gtc ttc        231
                           Met Ala Thr Ser Trp Gly Ala Val Phe
                           1                   5

atg ctg atc ata gcc tgc gtt ggc agc act gtc ttc tac aga gaa cag      279
Met Leu Ile Ile Ala Cys Val Gly Ser Thr Val Phe Tyr Arg Glu Gln
10                  15                  20                  25
```

```
cag acc tgg ttt gaa ggt gtc ttc ttg tct tcc atg tgc ccc att aat      327
Gln Thr Trp Phe Glu Gly Val Phe Leu Ser Ser Met Cys Pro Ile Asn
            30                  35                  40

gtc agt gcc ggc acc ttt tat gga att atg ttt gat gcg ggc agc act      375
Val Ser Ala Gly Thr Phe Tyr Gly Ile Met Phe Asp Ala Gly Ser Thr
            45                  50                  55

gga gct cgg att cat gtt tac act ttt gtg cag aaa aca gca gga cag      423
Gly Ala Arg Ile His Val Tyr Thr Phe Val Gln Lys Thr Ala Gly Gln
            60                  65                  70

ctc ccc ttt ctg gaa ggt gaa att ttt gat tct gtg aag ccg gga ctt      471
Leu Pro Phe Leu Glu Gly Glu Ile Phe Asp Ser Val Lys Pro Gly Leu
            75                  80                  85

tct gct ttt gtg gat cag ccc aaa cag ggt gct gag act gtc cag gag      519
Ser Ala Phe Val Asp Gln Pro Lys Gln Gly Ala Glu Thr Val Gln Glu
90                  95                  100                 105

ctc ttg gag gtg gcc aaa gac tcg atc ccc aga agc cac tgg gaa agg      567
Leu Leu Glu Val Ala Lys Asp Ser Ile Pro Arg Ser His Trp Glu Arg
            110                 115                 120

acc ccg gtg gtt ctg aaa gca acg gcc gga ctc cgt ttg ctg cct gag      615
Thr Pro Val Val Leu Lys Ala Thr Ala Gly Leu Arg Leu Leu Pro Glu
            125                 130                 135

cag aaa gcc cag gct ctg ctc ttg gag gta gag gag atc ttc aag aat      663
Gln Lys Ala Gln Ala Leu Leu Leu Glu Val Glu Glu Ile Phe Lys Asn
            140                 145                 150

tca cct ttc ctg gtc cca gat ggc agc gtt agc atc atg gat ggg tcc      711
Ser Pro Phe Leu Val Pro Asp Gly Ser Val Ser Ile Met Asp Gly Ser
            155                 160                 165

tat gaa ggc ata cta gcc tgg gtt acc gtg aac ttt cta aca ggt cag      759
Tyr Glu Gly Ile Leu Ala Trp Val Thr Val Asn Phe Leu Thr Gly Gln
170                 175                 180                 185

ctg cat ggt cgt ggc cag gag act gtg ggg acc ctt gac ctg ggg ggt      807
Leu His Gly Arg Gly Gln Glu Thr Val Gly Thr Leu Asp Leu Gly Gly
            190                 195                 200

gcc tcc acc caa atc acg ttt cta ccc cag ttt gag aaa acc ctg gaa      855
Ala Ser Thr Gln Ile Thr Phe Leu Pro Gln Phe Glu Lys Thr Leu Glu
            205                 210                 215

caa aca cct agg ggc tac ctc act tcc ttt gag atg ttt aac agc act      903
Gln Thr Pro Arg Gly Tyr Leu Thr Ser Phe Glu Met Phe Asn Ser Thr
            220                 225                 230

ttt aag ctc tat aca cat agt tac ttg gga ttt gga ctg aaa gct gca      951
Phe Lys Leu Tyr Thr His Ser Tyr Leu Gly Phe Gly Leu Lys Ala Ala
            235                 240                 245

aga ctg gca act ctg gga gcc ctg gaa gca aaa ggg act gat gga cat      999
Arg Leu Ala Thr Leu Gly Ala Leu Glu Ala Lys Gly Thr Asp Gly His
250                 255                 260                 265

acg ttt cga agt gcc tgt tta cca aga tgg ttg gaa gca gag tgg atc      1047
Thr Phe Arg Ser Ala Cys Leu Pro Arg Trp Leu Glu Ala Glu Trp Ile
            270                 275                 280
```

```
ttt ggg ggt gtg aaa tac cag tat ggt ggt aac caa gaa ggg gag atg      1095
Phe Gly Gly Val Lys Tyr Gln Tyr Gly Gly Asn Gln Glu Gly Glu Met
            285                 290             295

ggc ttt gaa ccc tgc tat gcg gaa gtg ctg agg gta gta cag ggg aaa      1143
Gly Phe Glu Pro Cys Tyr Ala Glu Val Leu Arg Val Val Gln Gly Lys
            300             305             310

ctt cac cag cca gaa gaa gtc cga gga agc gcc ttc tac gct ttc tct      1191
Leu His Gln Pro Glu Glu Val Arg Gly Ser Ala Phe Tyr Ala Phe Ser
            315             320             325

tac tac tac gat cga gcc gct gac aca cac ttg atc gat tat gaa aag      1239
Tyr Tyr Tyr Asp Arg Ala Ala Asp Thr His Leu Ile Asp Tyr Glu Lys
330             335             340             345

ggc ggg gtt tta aaa gtt gaa gat ttt gaa aga aaa gcc aga gaa gtg      1287
Gly Gly Val Leu Lys Val Glu Asp Phe Glu Arg Lys Ala Arg Glu Val
            350             355             360

tgt gac aac ttg ggg agc ttc tcc tcg ggc agt cct ttc ctc tgc atg      1335
Cys Asp Asn Leu Gly Ser Phe Ser Ser Gly Ser Pro Phe Leu Cys Met
            365             370             375

gac ctc act tac atc aca gcc ctg ttg aaa gat ggt ttg ggc ttt gcc      1383
Asp Leu Thr Tyr Ile Thr Ala Leu Leu Lys Asp Gly Leu Gly Phe Ala
            380             385             390

gaa cgg cac cct ctt aca gct cac aaa gaa agt gaa caa cat aga gac      1431
Glu Arg His Pro Leu Thr Ala His Lys Glu Ser Glu Gln His Arg Asp
            395             400             405

tgg ttg ggc ctt ggg ggc cac ctt tca cct gct cca gtc tct ggg cat      1479
Trp Leu Gly Leu Gly Gly His Leu Ser Pro Ala Pro Val Ser Gly His
410             415             420             425

cac cag ctg agg cca agc tcc acc tct gaa gcc tgc att tct gaa cca      1527
His Gln Leu Arg Pro Ser Ser Thr Ser Glu Ala Cys Ile Ser Glu Pro
            430             435             440

gtt ttc tca cag gaa ggc gtg gac tca gag aca ttt tct gac ctc tct      1575
Val Phe Ser Gln Glu Gly Val Asp Ser Glu Thr Phe Ser Asp Leu Ser
            445             450             455

gga aaa gcc tgg ccc gaa acc cgt taactggttt tataaggagg gaggggtttt    1629
Gly Lys Ala Trp Pro Glu Thr Arg
            460             465

tagatgagtc ttgctcttga gcctagtgat ttgggcttca atgatttgca catctaatgt    1689

gaatagctcc taaccacttg gtgggtgcat ggctggcacc agactgtaaa tcttttggga    1749

ttctttgtac agagtcctgc aaaggaaaaa agagaaaagg tttggaactc catgctagat    1809

tgcgagttca gagacaggtc cctggggacc aaagaacaat ctcgtttcaa cccttggatg    1869

cctcattgct ttgaatggat tcatttttgc ttataagctg atttactgaa atcccataac    1929

ccatcaatgc tgttaatttt tttcttccta cccttattac attccctacc ctaaaagcct    1989

gggggaaata cctggttttg cttcccatct ataattgaga aagagggggg aaaagatact    2049
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gtattagaat ttgtgtgatc ctgtggcaca atagatcaac caacccattt aaagcttaaa   2109

aaaaaaaaaa   2119

<210> 8

<211> 465

<212> PRT

<213> Mus musculus

<400> 8

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Met Ala Thr Ser Trp Gly Ala Val Phe Met Leu Ile Ile Ala Cys Val
1               5                   10                  15

Gly Ser Thr Val Phe Tyr Arg Glu Gln Gln Thr Trp Phe Glu Gly Val
            20                  25                  30

Phe Leu Ser Ser Met Cys Pro Ile Asn Val Ser Ala Gly Thr Phe Tyr
        35                  40                  45

Gly Ile Met Phe Asp Ala Gly Ser Thr Gly Ala Arg Ile His Val Tyr
    50                  55                  60

Thr Phe Val Gln Lys Thr Ala Gly Gln Leu Pro Phe Leu Glu Gly Glu
65                  70                  75                  80

Ile Phe Asp Ser Val Lys Pro Gly Leu Ser Ala Phe Val Asp Gln Pro
                85                  90                  95

Lys Gln Gly Ala Glu Thr Val Gln Glu Leu Leu Glu Val Ala Lys Asp
            100                 105                 110

Ser Ile Pro Arg Ser His Trp Glu Arg Thr Pro Val Val Leu Lys Ala
            115                 120                 125

Thr Ala Gly Leu Arg Leu Leu Pro Glu Gln Lys Ala Gln Ala Leu Leu
    130                 135                 140

Leu Glu Val Glu Glu Ile Phe Lys Asn Ser Pro Phe Leu Val Pro Asp
145                 150                 155                 160

Gly Ser Val Ser Ile Met Asp Gly Ser Tyr Glu Gly Ile Leu Ala Trp
                165                 170                 175

Val Thr Val Asn Phe Leu Thr Gly Gln Leu His Gly Arg Gly Gln Glu
            180                 185                 190
```

Thr Val Gly Thr Leu Asp Leu Gly Gly Ala Ser Thr Gln Ile Thr Phe
      195   200   205

Leu Pro Gln Phe Glu Lys Thr Leu Glu Gln Thr Pro Arg Gly Tyr Leu
      210   215   220

Thr Ser Phe Glu Met Phe Asn Ser Thr Phe Lys Leu Tyr Thr His Ser
225   230   235   240

Tyr Leu Gly Phe Gly Leu Lys Ala Ala Arg Leu Ala Thr Leu Gly Ala
          245   250   255

Leu Glu Ala Lys Gly Thr Asp Gly His Thr Phe Arg Ser Ala Cys Leu
          260   265   270

Pro Arg Trp Leu Glu Ala Glu Trp Ile Phe Gly Gly Val Lys Tyr Gln
          275   280   285

Tyr Gly Gly Asn Gln Glu Gly Glu Met Gly Phe Glu Pro Cys Tyr Ala
      290   295   300

Glu Val Leu Arg Val Val Gln Gly Lys Leu His Gln Pro Glu Glu Val
305   310   315   320

Arg Gly Ser Ala Phe Tyr Ala Phe Ser Tyr Tyr Tyr Asp Arg Ala Ala
             325   330   335

Asp Thr His Leu Ile Asp Tyr Glu Lys Gly Gly Val Leu Lys Val Glu
          340   345   350

Asp Phe Glu Arg Lys Ala Arg Glu Val Cys Asp Asn Leu Gly Ser Phe
          355   360   365

Ser Ser Gly Ser Pro Phe Leu Cys Met Asp Leu Thr Tyr Ile Thr Ala
      370   375   380

Leu Leu Lys Asp Gly Leu Gly Phe Ala Glu Arg His Pro Leu Thr Ala
385   390   395   400

His Lys Glu Ser Glu Gln His Arg Asp Trp Leu Gly Leu Gly Gly His
          405   410   415

Leu Ser Pro Ala Pro Val Ser Gly His His Gln Leu Arg Pro Ser Ser
          420   425   430

Thr Ser Glu Ala Cys Ile Ser Glu Pro Val Phe Ser Gln Glu Gly Val

435   440   445

Asp Ser Glu Thr Phe Ser Asp Leu Ser Gly Lys Ala Trp Pro Glu Thr
    450   455   460

Arg
465

<210> 9

<211> 428

<212> PRT

<213> Homo sapiens

<400> 9

Met Ala Thr Ser Trp Gly Thr Val Phe Phe Met Leu Val Val Ser Cys
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Val Cys Ser Ala Val Ser His Arg Asn Gln Gln Thr Trp Phe Glu Gly
            20   25   30

Ile Phe Leu Ser Ser Met Cys Pro Ile Asn Val Ser Ala Ser Thr Leu
        35   40   45

Tyr Gly Ile Met Phe Asp Ala Gly Ser Thr Gly Thr Arg Ile His Val
    50   55   60

Tyr Thr Phe Val Gln Lys Met Pro Gly Gln Leu Pro Ile Leu Glu Gly
65   70   75   80

Glu Val Phe Asp Ser Val Lys Pro Gly Leu Ser Ala Phe Val Asp Gln
                85   90   95

Pro Lys Gln Gly Ala Glu Thr Val Gln Gly Leu Leu Glu Val Ala Lys
            100   105   110

Asp Ser Ile Pro Arg Ser His Trp Lys Lys Thr Pro Val Val Leu Lys
        115   120   125

Ala Thr Ala Gly Leu Arg Leu Leu Pro Glu His Lys Ala Lys Ala Leu
    130   135   140

Leu Phe Glu Val Lys Glu Ile Phe Arg Lys Ser Pro Phe Leu Val Pro
145   150   155   160

Lys Gly Ser Val Ser Ile Met Asp Gly Ser Asp Glu Gly Ile Leu Ala
                    165   170   175

Trp Val Thr Val Asn Phe Leu Thr Gly Gln Leu His Gly His Arg Gln
                180   185   190

Glu Thr Val Gly Thr Leu Asp Leu Gly Gly Ala Ser Thr Gln Ile Thr
                195   200   205

Phe Leu Pro Gln Phe Glu Lys Thr Leu Glu Gln Thr Pro Arg Gly Tyr
        210   215   220

Leu Thr Ser Phe Glu Met Phe Asn Ser Thr Tyr Lys Leu Tyr Thr His
225   230   235   240

Ser Tyr Leu Gly Phe Gly Leu Lys Ala Ala Arg Leu Ala Thr Leu Gly
                245   250   255

Ala Leu Glu Thr Glu Gly Thr Asp Gly His Thr Phe Arg Ser Ala Cys
                260   265   270

Leu Pro Arg Trp Leu Glu Ala Glu Trp Ile Phe Gly Gly Val Lys Tyr
        275   280   285

Gln Tyr Gly Gly Asn Gln Glu Gly Glu Val Gly Phe Glu Pro Cys Tyr
    290   295   300

Ala Glu Val Leu Arg Val Val Arg Gly Lys Leu His Gln Pro Glu Glu
305   310   315   320

Val Gln Arg Gly Ser Phe Tyr Ala Phe Ser Tyr Tyr Tyr Asp Arg Ala
                325   330   335

Val Asp Thr Asp Met Ile Asp Tyr Glu Lys Gly Gly Ile Leu Lys Val
                340   345   350

Glu Asp Phe Glu Arg Lys Ala Arg Glu Val Cys Asp Asn Leu Glu Asn
        355   360   365

Phe Thr Ser Gly Ser Pro Phe Leu Cys Met Asp Leu Ser Tyr Ile Thr
        370   375   380

Ala Leu Leu Lys Asp Gly Phe Gly Phe Ala Asp Ser Thr Val Leu Gln
385   390   395   400

Leu Thr Lys Lys Val Asn Asn Ile Glu Thr Gly Trp Ala Leu Gly Ala
                405   410   415

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Thr Phe His Leu Leu Gln Ser Leu Gly Ile Ser His
        420                 425
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<210> 10

<211> 455

<212> PRT

<213> P. sativum

<400> 10

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Met Glu Leu Leu Ile Lys Leu Ile Thr Phe Leu Leu Phe Ser Met Pro
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Ala Ile Thr Ser Ser Gln Tyr Leu Gly Asn Asn Leu Leu Thr Ser Arg
            20              25              30

Lys Ile Phe Leu Lys Gln Glu Glu Ile Ser Ser Tyr Ala Val Val Phe
        35              40              45

Asp Ala Gly Ser Thr Gly Ser Arg Ile His Val Tyr His Phe Asn Gln
    50              55              60

Asn Leu Asp Leu Leu His Ile Gly Lys Gly Val Glu Tyr Tyr Asn Lys
65              70              75              80

Ile Thr Pro Gly Leu Ser Ser Tyr Ala Asn Asn Pro Glu Gln Ala Ala
                85              90              95

Lys Ser Leu Ile Pro Leu Leu Glu Gln Ala Glu Asp Val Val Pro Asp
            100             105             110

Asp Leu Gln Pro Lys Thr Pro Val Arg Leu Gly Ala Thr Ala Gly Leu
        115             120             125

Arg Leu Leu Asn Gly Asp Ala Ser Glu Lys Ile Leu Gln Ser Val Arg
    130             135             140

Asp Met Leu Ser Asn Arg Ser Thr Phe Asn Val Gln Pro Asp Ala Val
145             150             155             160

Ser Ile Ile Asp Gly Thr Gln Glu Gly Ser Tyr Leu Trp Val Thr Val
                165             170             175

Asn Tyr Ala Leu Gly Asn Leu Gly Lys Lys Tyr Thr Lys Thr Val Gly
            180             185             190
```

Val Ile Asp Leu Gly Gly Gly Ser Val Gln Met Ala Tyr Ala Val Ser
     195   200   205

Lys Lys Thr Ala Lys Asn Ala Pro Lys Val Ala Asp Gly Asp Asp Pro
     210   215   220

Tyr Ile Lys Lys Val Val Leu Lys Gly Ile Pro Tyr Asp Leu Tyr Val
225   230   235   240

His Ser Tyr Leu His Phe Gly Arg Glu Ala Ser Arg Ala Glu Ile Leu
          245   250   255

Lys Leu Thr Pro Arg Ser Pro Asn Pro Cys Leu Leu Ala Gly Phe Asn
          260   265   270

Gly Ile Tyr Thr Tyr Ser Gly Glu Glu Phe Lys Ala Thr Ala Tyr Thr
        275   280   285

Ser Gly Ala Asn Phe Asn Lys Cys Lys Asn Thr Ile Arg Lys Ala Leu
    290   295   300

Lys Leu Asn Tyr Pro Cys Pro Tyr Gln Asn Cys Thr Phe Gly Gly Ile
305   310   315   320

Trp Asn Gly Gly Gly Gly Asn Gly Gln Lys Asn Leu Phe Ala Ser Ser
        325   330   335

Ser Phe Phe Tyr Leu Pro Glu Asp Thr Gly Met Val Asp Ala Ser Thr
        340   345   350

Pro Asn Phe Ile Leu Arg Pro Val Asp Ile Glu Thr Lys Ala Lys Glu
        355   360   365

Ala Cys Ala Leu Asn Phe Glu Asp Ala Lys Ser Thr Tyr Pro Phe Leu
    370   375   380

Asp Lys Lys Asn Val Ala Ser Tyr Val Cys Met Asp Leu Ile Tyr Gln
385   390   395   400

Tyr Val Leu Leu Val Asp Gly Phe Gly Leu Asp Pro Leu Gln Lys Ile
        405   410   415

Thr Ser Gly Lys Glu Ile Glu Tyr Gln Asp Ala Ile Val Glu Ala Ala
        420   425   430

Trp Pro Leu Gly Asn Ala Val Glu Ala Ile Ser Ala Leu Pro Lys Phe

Glu Arg Leu Met Tyr Phe Val
450   455

<210> 11

<211> 454

<212> PRT

<213> Solanum tuberosum

<400> 11

Met Leu Asn Gln Asn Ser His Phe Ile Phe Ile Ile Leu Ala Ile Phe
1   5   10   15

Leu Val Leu Pro Leu Ser Leu Leu Ser Lys Asn Val Asn Ala Gln Ile
            20   25   30

Pro Leu Arg Arg His Leu Leu Ser His Glu Ser Glu His Tyr Ala Val
            35   40   45

Ile Phe Asp Ala Gly Ser Thr Gly Ser Arg Val His Val Phe Arg Phe
        50   55   60

Asp Glu Lys Leu Gly Leu Leu Pro Ile Gly Asn Asn Ile Glu Tyr Phe
65   70   75   80

Met Ala Thr Glu Pro Gly Leu Ser Ser Tyr Ala Glu Asp Pro Lys Ala
                85   90   95

Ala Ala Asn Ser Leu Glu Pro Leu Leu Asp Gly Ala Glu Gly Val Val
                100   105   110

Pro Gln Glu Leu Gln Ser Glu Thr Pro Leu Glu Leu Gly Ala Thr Ala
            115   120   125

Gly Leu Arg Met Leu Lys Gly Asp Ala Ala Glu Lys Ile Leu Gln Ala
    130   135   140

Val Arg Asn Leu Val Lys Asn Gln Ser Thr Phe His Ser Lys Asp Gln
145   150   155   160

Trp Val Thr Ile Leu Asp Gly Thr Gln Glu Gly Ser Tyr Met Trp Ala
                165   170   175

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Ala Ile Asn Tyr Leu Leu Gly Asn Leu Gly Lys Asp Tyr Lys Ser Thr
        180                 185             190

Thr Ala Thr Ile Asp Leu Gly Gly Gly Ser Val Gln Met Ala Tyr Ala
        195             200                 205

Ile Ser Asn Glu Gln Phe Ala Lys Ala Pro Gln Asn Glu Asp Gly Glu
    210             215                 220

Pro Tyr Val Gln Gln Lys His Leu Met Ser Lys Asp Tyr Asn Leu Tyr
225             230                 235             240

Val His Ser Tyr Leu Asn Tyr Gly Gln Leu Ala Gly Arg Ala Glu Ile
            245                 250                 255

Phe Lys Ala Ser Arg Asn Glu Ser Asn Pro Cys Ala Leu Glu Gly Cys
            260                 265                 270

Asp Gly Tyr Tyr Ser Tyr Gly Gly Val Asp Tyr Lys Val Lys Ala Pro
        275                 280                 285

Lys Lys Gly Ser Ser Trp Lys Arg Cys Arg Arg Leu Thr Arg His Ala
    290                 295                 300

Leu Lys Ile Asn Ala Lys Cys Asn Ile Glu Glu Cys Thr Phe Asn Gly
305                 310                 315                 320

Val Trp Asn Gly Gly Gly Gly Asp Gly Gln Lys Asn Ile His Ala Ser
                325                 330                 335

Ser Phe Phe Tyr Asp Ile Gly Ala Gln Val Gly Ile Val Asp Thr Lys
            340                 345                 350

Phe Pro Ser Ala Leu Ala Lys Pro Ile Gln Tyr Leu Asn Ala Ala Lys
        355                 360                 365

Val Ala Cys Gln Thr Asn Val Ala Asp Ile Lys Ser Ile Phe Pro Lys
370                 375                 380

Thr Gln Asp Arg Asn Ile Pro Tyr Leu Cys Met Asp Leu Ile Tyr Glu
385                 390                 395                 400

Tyr Thr Leu Leu Val Asp Gly Phe Gly Leu Asn Pro His Lys Glu Ile
            405                 410                 415

Thr Val Ile His Asp Val Gln Tyr Lys Asn Tyr Leu Val Gly Ala Ala
        420                 425                 430
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Trp Pro Leu Gly Cys Ala Ile Asp Leu Val Ser Ser Thr Thr Asn Lys
        435   440   445

Ile Arg Val Ala Ser Ser
        450

<210>   12

<211>   473

<212>   PRT

<213>   Saccharomyces cerevisiae

<400>   12

Lys Thr Pro Glu Asp Ile Ser Ile Ile Pro Val Asn Asp Glu Pro Gly
1   5   10   15

Tyr Leu Gln Asp Ser Lys Thr Glu Gln Asn Tyr Pro Glu Leu Ala Asp
                20   25   30

Ala Val Lys Ser Gln Thr Ser Gln Thr Cys Ser Glu Glu His Lys Tyr
            35   40   45

Val Ile Met Ile Asp Ala Gly Ser Thr Gly Ser Arg Val His Ile Tyr
        50   55   60

Lys Phe Asp Val Cys Thr Ser Pro Pro Thr Leu Leu Asp Glu Lys Phe
65   70   75   80

Asp Met Leu Glu Pro Gly Leu Ser Ser Phe Asp Thr Asp Ser Val Gly
                85   90   95

Ala Ala Asn Ser Leu Asp Pro Leu Leu Lys Val Ala Met Asn Tyr Val
                100   105   110

Pro Ile Lys Ala Arg Ser Cys Thr Pro Val Ala Val Lys Ala Thr Ala
            115   120   125

Gly Leu Arg Leu Leu Gly Asp Ala Lys Ser Ser Lys Ile Leu Ser Ala
        130   135   140

Val Arg Asp His Leu Glu Lys Asp Tyr Pro Phe Pro Val Val Glu Gly
145   150   155   160

Asp Gly Val Ser Ile Met Gly Gly Asp Glu Glu Gly Val Phe Ala Trp
                165   170   175

Ile Thr Thr Asn Tyr Leu Leu Gly Asn Ile Gly Ala Asn Gly Pro Lys
       180   185   190

Leu Pro Thr Ala Ala Val Phe Asp Leu Gly Gly Gly Ser Thr Gln Ile
       195   200   205

Val Glu Glu Pro Thr Phe Pro Ile Asn Glu Lys Met Val Asp Gly Glu
210   215   220

His Lys Phe Asp Leu Lys Phe Gly Asp Glu Asn Tyr Thr Leu Tyr Gln
225   230   235   240

Phe Ser His Leu Gly Tyr Gly Leu Lys Glu Gly Arg Asn Lys Val Asn
          245   250   255

Ser Val Leu Val Glu Asn Ala Leu Lys Asp Lys Ile Leu Lys Gly Cys
       260   265   270

Asn Thr Lys Thr His Cys Leu Ser Ser Pro Cys Leu Pro Pro Lys Val
       275   280   285

Asn Ala Thr Asn Glu Lys Val Thr Leu Glu Ser Lys Glu Thr Tyr Thr
       290   295   300

Ile Asp Phe Ile Gly Pro Asp Glu Pro Ser Gly Ala Gln Cys Arg Phe
305   310   315   320

Leu Thr Asp Glu Ile Leu Asn Lys Asp Ala Gln Cys Gln Ser Pro Pro
       325   330   335

Cys Ser Phe Asn Gly Val His Gln Pro Ser Leu Val Arg Thr Phe Lys
       340   345   350

Glu Ser Asn Asp Ile Tyr Ile Phe Ser Tyr Phe Tyr Asp Arg Thr Thr
       355   360   365

Arg Pro Leu Gly Met Pro Leu Ser Phe Thr Leu Asn Glu Leu Asn Asp
370   375   380

Leu Ala Arg Ile Val Cys Lys Gly Glu Glu Thr Trp Asn Ser Val Phe
385   390   395   400

Ser Gly Ile Ala Gly Ser Leu Asp Glu Leu Glu Ser Asp Ser His Phe
       405   410   415

Cys Leu Asp Leu Ser Phe Gln Val Ser Leu Leu His Thr Gly Tyr Asp

                          420   425   430

Ile Pro Leu Gln Arg Glu Leu Arg Thr Gly Lys Lys Ile Ala Asn Lys
            435   440   445

Glu Ile Gly Trp Cys Leu Gly Ala Ser Leu Pro Leu Leu Lys Ala Asp
    450   455   460

Asn Trp Lys Cys Lys Ile Gln Ser Ala
465   470

<210>   13

<211>   153

<212>   PRT

<213>   Homo sapiens

<400>   13

Lys Tyr Gly Ile Val Leu Asp Ala Gly Ser Ser His Thr Ser Leu Tyr
1   5   10   15

Ile Tyr Lys Trp Pro Ala Glu Lys Glu Asn Asp Thr Gly Val Val His
                20   25   30

Gln Val Glu Glu Cys Arg Val Lys Gly Pro Gly Ile Ser Lys Phe Val
            35   40   45

Gln Lys Val Asn Glu Ile Gly Ile Tyr Leu Thr Asp Cys Met Glu Arg
    50   55   60

Ala Arg Glu Val Ile Pro Arg Ser Gln His Gln Glu Thr Pro Val Tyr
65   70   75   80

Leu Gly Ala Thr Ala Gly Met Arg Leu Leu Arg Met Glu Ser Glu Glu
                85   90   95

Leu Ala Asp Arg Val Leu Asp Val Val Glu Arg Ser Leu Ser Asn Tyr
                100   105   110

Pro Phe Asp Phe Gln Gly Ala Arg Ile Ile Thr Gly Gln Glu Glu Gly
            115   120   125

Ala Tyr Gly Trp Ile Thr Ile Asn Tyr Leu Leu Gly Lys Phe Ser Gln
    130   135   140

Lys Thr Arg Trp Phe Ser Ile Val Pro
145   150

<210>   14

<211>   154

<212>   PRT

<213>   Rattus norvegicus

<400>   14

Val Lys Tyr Gly Ile Val Leu Asp Ala Gly Ser Ser His Thr Asn Leu
1   5   10   15

Tyr Ile Tyr Lys Trp Pro Ala Glu Lys Glu Asn Asp Thr Gly Val Val
                20   25   30

Gln Leu Leu Glu Glu Cys Gln Val Lys Gly Pro Gly Ile Ser Lys Tyr
            35   40   45

Ala Gln Lys Thr Asp Glu Ile Ala Ala Tyr Leu Ala Glu Cys Met Lys
        50   55   60

Met Ser Thr Glu Arg Ile Pro Ala Ser Lys Gln His Gln Thr Pro Val
65   70   75   80

Tyr Leu Gly Ala Thr Ala Gly Met Arg Leu Leu Arg Met Glu Ser Lys
                85   90   95

Gln Ser Ala Asp Glu Val Leu Ala Ala Val Ser Arg Ser Leu Lys Ser
            100   105   110

Tyr Pro Phe Asp Phe Gln Gly Ala Lys Ile Ile Thr Gly Gln Glu Glu
            115   120   125

Gly Ala Tyr Gly Trp Ile Thr Ile Asn Tyr Leu Leu Gly Arg Phe Thr
        130   135   140

Gln Glu Gln Ser Trp Leu Asn Phe Ile Ser
145   150

<210>   15

<211>   153

<212>   PRT

<213>   Homo sapiens

Page 30

<400> 15

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Lys Tyr Gly Ile Val Leu Asp Ala Gly Ser Ser His Thr Ser Met Phe
1               5               10              15

Ile Tyr Lys Trp Pro Ala Asp Lys Glu Asn Asp Thr Gly Ile Val Gly
            20              25              30

Gln His Ser Ser Cys Asp Val Pro Gly Gly Gly Ile Ser Ser Tyr Ala
        35              40              45

Asp Asn Pro Ser Gly Ala Ser Gln Ser Leu Val Gly Cys Leu Glu Gln
    50              55              60

Ala Leu Gln Asp Val Pro Lys Glu Arg His Ala Gly Thr Pro Leu Tyr
65              70              75              80

Leu Gly Ala Thr Ala Gly Met Arg Leu Leu Asn Leu Thr Asn Pro Glu
            85              90              95

Ala Ser Thr Ser Val Leu Met Ala Val Thr His Thr Leu Thr Gln Tyr
            100             105             110

Pro Phe Asp Phe Arg Gly Ala Arg Ile Leu Ser Gly Gln Glu Glu Gly
        115             120             125

Val Phe Gly Trp Val Thr Ala Asn Tyr Leu Leu Glu Asn Phe Ile Lys
    130             135             140

Tyr Gly Trp Val Gly Arg Trp Phe Arg
145             150
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<210> 16

<211> 150

<212> PRT

<213> Gallus gallus

<400> 16

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Phe Lys Tyr Gly Ile Val Leu Asp Ala Gly Ser Ser His Thr Ala Val
1               5               10              15

Phe Ile Tyr Lys Trp Pro Ala Asp Lys Glu Asn Asp Thr Gly Val Val
            20              25              30
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Ser Glu His Ser Met Cys Asp Val Glu Gly Pro Gly Ile Ser Ser Tyr
        35   40   45

Ser Ser Lys Pro Pro Ala Ala Gly Lys Ser Leu Glu His Cys Leu Ser
        50   55   60

Gln Ala Met Arg Asp Val Pro Lys Glu Lys His Ala Asp Thr Pro Leu
65   70   75   80

Tyr Leu Gly Ala Thr Ala Gly Met Arg Leu Leu Thr Ile Ala Asp Pro
                85   90   95

Pro Ser Gln Thr Cys Leu Ser Ala Val Met Ala Thr Leu Lys Ser Tyr
                100   105   110

Pro Phe Asp Phe Gly Gly Ala Lys Ile Leu Ser Gly Glu Glu Glu Gly
            115   120   125

Val Phe Gly Trp Ile Thr Ala Asn Tyr Leu Leu Glu Asn Phe Ile Lys
    130   135   140

Arg Gly Trp Leu Gly Glu
145   150

<210>   17

<211>   148

<212>   PRT

<213>   Caenorhabditis elegans

<400>   17

Ile Lys Tyr Gly Val Ile Cys Asp Ala Gly Ser Ser Gly Thr Arg Leu
1   5   10   15

Phe Val Tyr Thr Leu Lys Pro Leu Ser Gly Gly Leu Thr Asn Ile Asp
            20   25   30

Thr Leu Ile His Glu Ser Glu Pro Val Val Lys Lys Val Thr Pro Gly
        35   40   45

Leu Ser Ser Phe Gly Asp Lys Pro Glu Gln Val Val Glu Tyr Leu Thr
    50   55   60

Pro Leu Leu Arg Phe Ala Glu Glu His Ile Pro Tyr Glu Gln Leu Gly

Glu Thr Asp Leu Leu Ile Phe Ala Thr Ala Gly Met Arg Leu Leu Pro
                    85   90   95

Glu Ala Gln Lys Asp Ala Ile Ile Lys Asn Leu Gln Asn Gly Leu Lys
                100   105   110

Ser Val Thr Ala Leu Arg Val Ser Asp Ser Asn Ile Arg Ile Ile Asp
                115   120   125

Gly Ala Trp Glu Gly Ile Tyr Ser Trp Ile Ala Val Asn Tyr Ile Leu
        130   135   140

Gly Arg Phe Asp
145

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<211>   10

<212>   RNA

<213>   Mus musculus

<400>   18
aagaauaugg   10

<210>   19

<211>   10

<212>   RNA

<213>   Vertebrate

<400>   19
gccgccaugg   10

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<213>   Artificial Sequence

<220>

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<213> Artificial Sequence

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attgatgggt cttgggattg c

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<211> 10

<212> RNA

<213> Homo sapiens

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augugaauga

10

<210> 29

<211> 10

<212> RNA

<213> Homo sapiens

<400> 29
acaaggauga

10

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<211> 6

<212> RNA

<213> Homo sapiens

<400> 30
aauaaa

6

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<211> 20

<212> DNA

<213> Homo sapiens

<400> 31
caggtcactt atggagcctg

20

<210> 32

<211> 18

<212> DNA

<213> Homo sapiens

<400> 32
ccatggacaa aataggac

18